

X-ray Optics Development For X-ray Laser Systems

T.W. Barbee, Jr.

*Lawrence Livermore National Laboratory,
P.O. Box 808, Livermore, California, 94550*

Development of multilayer mirrors exhibiting high (or adequate) near normal incidence reflectivities at 4.5-45 nm and of thin (100 nm or less) membranes of low absorption material with excellent uniformity and strength have made it recently possible to design and implement advanced x-ray laser based diagnostic concepts for plasmas. These advanced diagnostic systems have applied many (up to fifteen) multilayer optics operating at near normal incidence or angles of incidence greater than 60 degrees grazing as well as beam splitter structures: the multilayer optic reflection efficiency as well as the brightness of the x-ray laser sources enables the use of a large number of multilayer optics. These results are the culmination of a extended effort in this arena by a number of groups and investigators. In this presentation a review of the primary problems in the application of multilayer optics in x-ray laser systems is first outlined and work in this area summarized. Early results are then outlined and discussed. More recent results are then considered in more detail and the performance of multilayer optics currently available to the x-ray laser community discussed. The talk is summarized by an evaluation of potential developments in multilayer optics that would extend the capabilities of x-ray laser systems and experimentation.

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